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# REMOTE SENSING PROGRAM

81-10015  
CR-143532

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## ACTIVITY REPORT

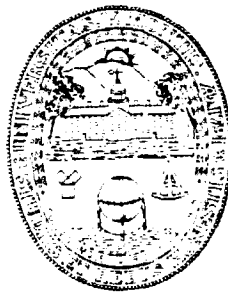
NASA GRANT NSG-7453

## PROGRESS REPORT

June 1, 1978 - May 31, 1980

supported by

National Aeronautics and Space Administration



UNIVERSITY OF VERMONT  
SCHOOL OF NATURAL RESOURCES  
BURLINGTON, VERMONT

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ANNUAL REPORT AND SUMMARY  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
Grant NSG-7453

by

Remote Sensing Program  
School of Natural Resources  
University of Vermont  
Burlington, Vermont 05405

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Report for Period

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## INTRODUCTION

In June, 1978, The School of Natural Resources at the University of Vermont was awarded NASA Grant NSG-7453 for a three year project entitled "The Development of a Remote Sensing Applications Program for Vermont". The purpose of this program is to encourage investigation and technology transfer for practical applications of remote sensing technology to solve earth resource problems. This project was renewed at first year level funding in June 1979 and again in June 1980.

The primary objectives of this program as originally stated remained unchanged and are as follows:

1. To test and evaluate the applicability of remote sensing technology to the solution of specific problems faced by resource managers and decision makers at the local, town, county and state levels.
2. To identify mechanisms and implement procedures for the transfer of applicable technology to appropriate user groups and for user groups to transmit needs to individuals competent in remote sensing technology.
3. To enhance the comprehensive education and research programs of the University of Vermont by presence of resident expertise in remote sensing technology and the development and acquisition of this technology.

The Grant has provided most of the Programs' funding during the first two years of its existence. Our management philosophy has been to conduct activities within the framework of the stated objectives.

## PROGRAM HIGHLIGHTS

During the initial year, activities were undertaken in areas related to meeting all three of the objectives. Particular emphasis was placed on activities concerned with the development of resident technical

expertise and resources. At the same time activities to acquaint potential users with the benefits of remote sensing technology were conducted. During this same year several applications projects were initiated.

During the second year greater emphasis was directed toward the undertaking of applications projects that would promote and expand the use of remote sensing as an efficient means of helping solve earth resource problems. Most of these have examined methods of detecting or monitoring a problem or to provide a data base for more comprehensive analysis.

Major accomplishments during the first two years of Grant funding include the following:

1. Acquisition, installation and operation of the <sup>6</sup>OSER digital processing system on the UVM IBM 3031 computer.
2. Acquisition and operation of printing and CRT computer terminals for remote access to computer facilities for analysis of remotely sensed digital data.
3. Acquisition and operation of optical interpretation and image transfer devices for use with all types of aerial photography.
4. Development of audio-visual and other training materials for use in presentations, workshops and short courses to enhance technology transfer.
5. In cooperation with federal, state and local agencies develop some eleven demonstration projects both large and small to show the feasibility of using remote sensing technology as a means of acquiring various kinds of useful environmental information.

#### PROGRAM IMPACT

As a result of this program many outside organizations, federal, state, local as well as private have begun to use remote sensing technology in their day to day activities. Many organizations who might not have done so otherwise, are active users today. The program has

become a major remote sensing technology resource in Vermont and northern New England. During the second year of the program more than fifty inquiries were received in the form of telephone calls, letters and personal visits. It is safe to say that little if any of this would have occurred without the program funding from NASA.

The accompanying tables provide descriptive information on Grant funded activities during the first two years of the program. In addition to specific project activities, an additional table showing remote sensing educational activities including courses and enrollments. Many of these have benefited directly through the availability of program resources and facilities. Six graduate students have been directly involved in project work and two of these have been entirely supported by grant funds.



UVM/SCHOOL OF NATURAL RESOURCES  
REMOTE SENSING APPLICATIONS PROGRAM

YEAR	TITLE/DESCRIPTION	DATA SOURCE	COOPERATING AGENCIES	COOPERATIVE SUPPORT	COMMERCIAL SPIN-OFF	EDUCATIONAL ACTIVITIES	AGENCY CONTACTS
1978-1980	General Education and Technology Transfer	Landsat CCT and imagery, all types of aircraft and manned spacecraft photography	NASA/ERSAC	NASA/ERSAC	None	<p>Training Sessions</p> <p>State Agency personnel (computer processing Landsat)</p> <p>Briefings</p> <p>State Agency personnel (3 occasions)</p> <p>Workshops</p> <p>Vt. Dept. Forests &amp; Parks personnel (4 occasions)</p> <p>Vt. Dept. Fish &amp; Game personnel (1 occasion)</p> <p>Presentations</p> <p>Vt. House &amp; Senate Appropriations and Natural Resource Committees</p> <p>Agency of Environmental Conservation staff</p> <p>Burlington Lions Club</p>	<p>VT. DEPT. OF FORESTS AND PARKS</p> <p>VT. DEPT. OF FISH AND GAME</p> <p>STATE OFFICE/SCS</p> <p>UVM/COLLEGE OF AGRICULTURE</p> <p>VT. STATE PLANNING OFFICE</p>
1978-1980	Systems Development for Data Handling and Analysis	Landsat CCT, high, medium and low altitude aerial photography	UVM/COMPUTING CENTER PENN STATE UNIV. NASA/ERSAC	UVM/COMPUTING CENTER	None	None	None

UVM/SCHOOL OF NATURAL RESOURCES  
REMOTE SENSING APPLICATION PROGRAM  
(continued)

YEAR	TITLE/DESCRIPTION	DATA SOURCE	COOPERATING AGENCIES	COOPERATIVE SUPPORT	COMMERCIAL SPIN-OFF	EDUCATIONAL ACTIVITIES	AGENCY CONTACTS
1978-1980	Vermont Land Cover Classification	Landsat CCT, high altitude CIR aerial photography	ERRSAC VT. DEPT. FORESTS AND PARKS VT. DEPT. WATER RESOURCES	VT. DEPT. FORESTS AND PARKS/MAN-YEAR	Agency of Environmental Conservation acquired statewide coverage of high altitude CIR	Presentations (2) Briefings (6)	VT. FISH AND GAME DEPT. ADIRONDACK PARK COMMISSION
1978-1980	Land Use Change Demonstration	Landsat CCT, high altitude CIR aerial photography, medium altitude B & W aerial photography	CHARLOTTE PLANNING COMMISSION	NONE	None	Briefings (2) M.S. Graduate (1)	CHITTENDEN COUNTY REGIONAL PLANNING COMMISSION
1979	Land Cover/Use Classification for Planning	High altitude CIR aerial photography, medium altitude B & W aerial photography	CENTRAL VERMONT REGIONAL PLANNING COMMISSION	CVRPC - \$500 funding	Planning consultant used data base	Undergraduate (1) Briefings (2)	TOWN MANAGERS OF FAYSTON, WAITSFIELD, AND WARREN
1979-1980	Vermont Remote Sensing Data Inventory	All known aerial photography	UVM/DEPT. OF GEOGRAPHY	NONE	None	M.S. Graduate (1) Undergraduate (1)	NONE
1979-1980	Land Cover/Use Change for Watershed Monitoring	Landsat CCT, high altitude CIR aerial photography, medium altitude B & W aerial photography	UVM/WATER RESOURCES RESEARCH CENTER SOIL CONSERVATION SERVICE	NONE	Expenditures for aerial photography and ortho-photo maps	Briefings (4) M.S. Graduate (2)	CHITTENDEN COUNTY SCS CNRCL-CORPS OF ENGINEERS

UNIV/SCHOOL OF NATURAL RESOURCES  
REMOTE SENSING APPLICATIONS PROGRAM  
(continued)

YEAR	TITLE/DESCRIPTION	DATA SOURCE	COOPERATING AGENCIES	COOPERATIVE SUPPORT	COMMERCIAL SPIN-OFF	EDUCATIONAL ACTIVITIES	AGENCY CONTACTS
1979-1980	Forest Insect Defoliation Detection	Landsat CCT, high altitude aerial photography, medium altitude B & W aerial photography	VT. DEPT. FORESTS AND PARKS	VT. DEPT. FORESTS AND PARKS	None	Undergraduate (2)	NONE
1979-1980	Lake and Pond Watershed Cover Classification	Landsat CCT, high altitude CIR aerial photography	VT. DEPT. WATER RESOURCES	VT. DEPT. WATER RESOURCES. 2 MAN-YEAR.	Contract photo and scanner flights	Briefings (2) M.S. Graduate (1)	NONE
1980	River Watershed Cover Inventory	Landsat CCT, high altitude CIR aerial photography	SOIL CONSERVATION SERVICE - STATE OFFICE	MAPS, SUPPLIES FROM SCS	None	Briefings (3) M.S. Graduate (1)	NONE
1980	Coniferous Species Differentiation	Landsat CCT, high altitude CIR aerial photography, medium altitude B & W photography	UNIV/FORESTRY DEPT.	TRAVEL FUNDS FOR GRADUATE STUDENT	None	M.S. Graduate (1)	VT. DEPT. OF FORESTS AND PARKS
1980	Water Quality Monitoring	Landsat CCT	VT. WATER RESOURCES DEPARTMENT ERRSAC	VT. WATER RESOURCES DEPARTMENT. 2 MAN-YEAR.	Commercial aerial photography and aircraft scanner flights	Briefings (3)	ENVIRONMENTAL PROTECTION AGENCY
1980	Water Use Conflict Study	Low altitude B & W aerial photography, Ortho photo maps	UNIV/RECREATION MANAGEMENT PROGRAM	NONE	None	Undergraduate (3)	NONE
1980	Water Body Inventory	Landsat CCT, high altitude CIR aerial photography	UNIV/WILDLIFE BIOLOGY PROGRAM	NONE	None	M.S. Graduate (1)	VT. FISH AND GAME DEPT. SOIL CONSERVATION SERVICE

REMOTE SENSING COURSES AND ENROLLMENTS  
UNIVERSITY OF VERMONT

Fall 1978 - Spring 1980

Semester and Year	Department and Number	Course Title	Enrollment		
			Undergrad	Graduate	Total
Fall 1978	Forestry 142 <sup>1</sup> Geography 161 <sup>2</sup>	Forest Photogrammetry Remote Sensing of Environment	13 8	2 0	15 8
Spring 1979	Geography 261 <sup>3</sup>	Remote Sensing and Environmental Problems	3	2	5
Fall 1979	Forestry 142 Forestry 285 Geography 161	Forest Photogrammetry Special Topics in Remote Sensing Remote Sensing of Environment	21 0 16	1 2 0	22 2 16
Spring 1980	Civil Engineering 210 <sup>4</sup> Forestry 285 Geography 261	Photo Interpretation Special Topics in Remote Sensing Remote Sensing and Environmental Problems	20 0 2	1 5 0	21 5 2

<sup>1</sup>Offered continuously since 1968

<sup>2</sup>First offered 1972

<sup>3</sup>First offered 1973

<sup>4</sup>First offered 1971